REMARKS

This paper is being provided in response to the May 6, 2004 Final Office Action for the above-referenced application. In this response, Applicant has amended Claims 1, 7, and 14 in order to clarify that which Applicant deems to be the claimed invention. Applicant respectfully submits that the amendments to the claims are all supported by the originally filed application.

The rejection of claims 1-19 under 35 U.S.C. 102(b) as being anticipated by U.S. patent number 5,889,935 to Ofek, et al. (hereinafter "Ofek") is hereby traversed and reconsideration thereof is respectfully requested in view of amendments of the claims contained herein.

Independent Claim 1, as amended herein, recites a method of reversing a communication path between a first volume on a first storage device and a second volume on a second storage device. The method is recited as including suspending communication between the first and second volumes while maintaining operations for other volumes on the storage devices, causing the first volume to change from a source volume to a destination volume without destroying the first volume, causing the second volume to change from a destination volume to a source volume without destroying the second volume, and resuming communication between the first and second volumes after causing the first volume to change from a source volume to a destination volume and causing the second volume to change from a destination volume to a source volume and prior to synchronizing the volumes, wherein, in response to a data access operation to the second volume and valid data for the data access operation existing only on the first volume, the data access operation to the second volume is satisfied by accessing data from the first volume. Claims 2-6 depend from Claim 1.

Independent Claim 7, as amended herein, recites a method of managing volumes on storage devices. The method includes receiving a command requesting reversal of a communication path between a first volume on a first storage device and a second volume on a second storage device, suspending communication between the first and second volumes while maintaining operations for other volumes of the storage devices, causing the first volume to change from a source volume to a destination volume without destroying the first volume, causing the second volume to change from a destination volume to a source volume without destroying the second volume, and resuming communication between the first and second volumes after causing the first volume to change from a source volume to a destination volume and causing the second volume to change from a destination volume to a source volume and prior to synchronizing the volumes, wherein, in response to a data access operation to the second volume and valid data for the data access operation existing only on the first volume, the data access operation to the second volume is satisfied by accessing data from the first volume. Claims 8-13 depend from Claim 7.

Independent Claim 14, as amended herein, recites a computer program product that reverses a communication path between a first volume on a first storage device and a second volume on a second storage device. The computer program product is recited as including executable code that suspends communication between the first and second volumes while maintaining operation for other volumes of the storage devices, executable code that causes the first volume to change from a source volume to a destination volume without destroying the first volume, executable code that causes the second volume to change from a destination volume to a source volume without destroying the second volume, and executable code that resumes communication between the first and second volumes after the first volume changes from a

source volume to a destination volume and the second volume changes from a destination volume to a source volume and prior to synchronizing the volumes, wherein, in response to a data access operation to the second volume and valid data for the data access operation existing only on the first volume, the data access operation to the second volume is satisfied by accessing data from the first volume. Claims 15-19 depend from Claim 14.

Ofek discloses two data storage systems that are interconnected by a data length for remote mirroring of data. Each volume of data is configured as local, primary in a remotely mirrored volume pair or secondary in a remotely mirrored volume pair. Figures 14 and 15 of Ofek and the corresponding text in Column 33 disclose data migration which may be needed when recovering from an all-link failure after continued processing upon a primary (R1) volume. Column 33 also discloses that data migration may also occur when a data center or host processor is moved from a local site to a remote site. Figure 15 of Ofek shows a first step where a host processing with the primary (R1) volume is suspended. Figure 15 shows a second step where the changed tracks of the primary (R1) volume, as indicated in a bit mask, are copied to the secondary (R2) volume. Following that step, Figure 15 shows a last step where the migration is finished so that the primary (R1) and secondary (R2) volumes are synchronized, and processing may resume using either of the volumes as a primary volume. In connection with this, Column 34 lines 54-63 disclose:

> Once this copying is done, the migration task is finished. The primary (R1) and the secondary (R2) volumes are in sync, and they contain the same data. *Host processing may then resume* by accessing the primary (R1) volume in remotely mirroring data to the secondary volume. Alternatively, before resuming host processing, the linked data storage system could be reconfigured to reverse the roles of the primary (R1) and the secondary (R2) volumes, so that the host would directly access what was the secondary (R2) volume. (emphasis added)

Column 10, lines 39-47 of Ofek disclose:

> Accordingly, each data storage device keeps data validity information about its mirrored device. If for some reason a device is not accessible, either the primary or the secondary device, every new write command goes to the accessible mirrored device along with information that the not accessible device has a track which is not valid. As soon as the non-accessible device becomes accessible, then automatically, as a background operation, the drives re-synchronize.

As indicated by the flowchart of Figure 15 and the text of Column 34, set forth above, Ofek discloses that the R1 and R2 volumes need to be synchronized prior to swapping the R1 and R2 volumes. That is, before the R1 and R2 volumes may be swapped in Ofek, the data on the R1 volume must be the same as the data on the R2 volume. This is because Ofek does not disclose a mechanism of resuming operation without first synchronizing the R1 and R2 volumes when the R1 and R2 volumes have been swapped.

Furthermore, the disclosure at column 10 of Ofek precedes the disclosure at column 14 and has nothing to do with swapping R1 and R2 as disclosed by Ofek at column 34. Instead, the disclosure at column 10 of Ofek teaches operations to be performed in one or the other of the primary or secondary (or links thereto) fail. The synchronization disclosed at column 10 of Ofek relates to the synchronization that takes place after the source of the failure is remedied.

In contrast, the independent claims of the present application, as modified herein, specifically recite resuming operation after swapping the source and destination and prior to synchronizing the volumes where, in response to a data access operation to the second volume (the new R1 volume) and valid data for the data access operation existing only on the first

volume (the new R2 volume), the data access operation to the local storage device (R1) is satisfied by accessing data from the remote storage device (R2). Thus communication is resumed after the swap and before synchronization. This is shown in Figure 3 of the present application and described in the corresponding text beginning at the top of Page 15, which specifically discloses the situation where valid data may exist either on the local storage device or on the remote storage device. As set forth in Figure 3 and the corresponding description, if, after the swap has taken place, the valid data is located on the remote storage device and not the local storage device, the remote storage device is used to obtain the data. Applicants respectfully submit that this recited feature of the present claimed invention is neither shown, taught, nor suggested by Ofek.

It is further noted that the disclosure at column 10 of Ofek does not include any teaching relating to swapping R1 and R2 and that the disclosure at column 34 of Ofek does not include any teaching regarding selecting whether to access the R1 or the R2 based on the location of the valid data. It is further submitted that there is no teaching or suggestion to combine these separate parts of Ofek and that, in fact, it is not clear that the combination would be operative since the disclosure at column 34 of Ofek specifically teaches that the R1 and the R2 volumes need to be synchronized prior to swapping (contrary to the present independent claims) while the disclosure at column 10 of Ofek teaches operating without first synchronizing (i.e., synchronizing after the writes).

Accordingly, for all of the reasons set forth above, Applicants respectfully request that this rejection be withdrawn.

Based on the above, Applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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Date

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